## APPENDIX B

## SUPPLEMENTAL LIST OF ACUTE TOXICITY TEST SPECIES

| TEST ORGANISM | | TEST TEMP (°C) | LIFE STAGE |
|---|---|---|---|
| **FRESHWATER SPECIES: VERTEBRATES - WARMWATER** | | | |
| *Cyprinella leedsi*[1] | Bannerfin shiner | 25 | 1-14 days |
| *Lepomis macrochirus* | Bluegill sunfish | 20,25 | " " |
| *Ictalurus punctatus* | Channel catfish | " | " " |
| **FRESHWATER SPECIES: INVERTEBRATES - COLDWATER** | | | |
| *Pteronarcys spp.* | Stoneflies* | 12 | larvae |
| *Pacifastacus leniusculus* | Crayfish* | " | juveniles |
| *Baetis spp.* | Mayflies* | " | nymphs |
| *Ephemerella spp.* | " | " | " |
| **FRESHWATER SPECIES: INVERTEBRATES - WARMWATER** | | | |
| *Hyalella spp.* | Amphipods | 20,25 | juveniles |
| *Gammarus lacustris* | " | " | " |
| *G. fasciatus* | " | " | " |
| *G. pseudolimnaeus* | " | " | " |
| *Hexagenia limbata* | Mayflies | " | nymphs |
| *H. bilineata* | " | " | " |
| *Chironomus* spp. | Midges | " | larvae |

*Stoneflies, crayfish, and mayflies may have to be field collected and acclimated for a period of time to ensure the health of the organisms and that stress from collection is past. Species identification must be verified.

[1] Test conditions for *Cyprinella leedsi* and *Holmesimysis costata* are found in Table 14 and Table 19, respectively, in Section 9.

**SUPPLEMENTAL LIST OF ACUTE TOXICITY TEST SPECIES (CONTINUED)**

| TEST ORGANISM | | TEST TEMP (°C) | SALINITY (‰) | LIFE STAGE |
|---|---|---|---|---|
| **MARINE AND ESTUARINE SPECIES: VERTEBRATES - COLDWATER** | | | | |
| *Parophrys vetulus* | English sole | 12 | 32-34 | 1-90 days |
| *Citharichys sitigmaeus* | Sanddab | " | " | " " |
| *Pseudopleuronectes americanus* | Winter flounder | " | " | post metamorphosis |
| **MARINE AND ESTUARINE SPECIES: VERTEBRATES - WARMWATER** | | | | |
| *Paralichthys dentatus* | Flounder | 20,25 | 32-34 | 1-90 days |
| *P. lethostigma* | " | " | " | " " |
| *Fundulus similis* | Killifish | " | 20-32 | 1-30 days |
| *Fundulus heteroclitus* | Mummichog | " | 25-32 | " " |
| *Lagodon rhomboides* | Pinfish | " | 20-32 | 1-90 days |
| *Orthipristis chrysoptera* | Pigfish | " | 15-30 | " " |
| *Leostomus xanthurus* | Spot | " | 10-30 | " " |
| *Gasterosteus aculeatus* | Threespine stickleback | " | 20-32 | 1-30 days |
| *Atherinops affinis* | Topsmelt | 21 | 10-30 | 7-15 days |
| **MARINE AND ESTUARINE SPECIES: INVERTEBRATES - COLDWATER** | | | | |
| *Pandalus jordani* | Oceanic shrimp | 12 | 25-32 | juvenile |
| *Strongylocentrotus droebachiensis* | Green sea urchin | " | 32-34 | gametes/embryo |
| *Strongylocentrotus purpuratus* | Purple sea urchin | " | " | " " |
| *Dendraster excentricus* | Sand dollar | " | " | " " |
| *Cancer magister* | Dungeness crab | " | " | juvenile |
| *Holmesimysis costata*[2] | Mysid | " | " | 1-5 days |
| **MARINE AND ESTUARINE SPECIES: INVERTEBRATES - WARMWATER** | | | | |
| *Callinectes sapidus* | Blue crab | 20,25 | 10-30 | juvenile |
| *Palaemonetes pugio* | Grass shrimp | " | 10-32 | 1-10 days |
| *P. vulgaris* | " " | " | " | " " |
| *P. intermedius* | " " | " | " | " " |
| *Penaeus setiferus* | White shrimp | " | 20-32 | post-larval |
| *Penaeus duorarum* | Pink shrimp | " | " | " " |
| *Penaeus aztecus* | Brown shrimp | " | " | " " |
| *Crangon septemspinosa* | Sand shrimp | " | 25-32 | " " |
| *Mysidopsis almyra* | Mysid | " | 10-32 | 1-5 days |
| *Neomysis americana* | " | " | " | " " |
| *Metamysidopsis elongata* | " | " | " | " " |
| *Crassostrea virginica* | American oyster | " | 20-32 | embryo |
| *Crassostrea gigas* | Pacific oyster | " | 25-32 | " |
| *Arbacia punctulata* | Purple sea urchin | " | 32-34 | gametes/embryo |

[2] Test conditions for *Holmesimysis costata* are found in Table 19.

## APPENDIX C

## DILUTOR SYSTEMS

Two proportional dilutor systems are illustrated: the solenoid valve system, and the vacuum siphon system.

1. **Solenoid and Vacuum Siphon Dilutor Systems**

The designs of the solenoid and vacuum siphon dilutor systems incorporate features from devices developed by many other Federal and state programs, and have been shown to be very versatile for on-site bioassays in mobile laboratories, as well as in fixed (central) laboratories. The Solenoid Valve system is fully controlled by solenoids (Figures 1, 2, and 3), and is preferred over the vacuum siphon system. The Vacuum Siphon system (Figures 1, 4, and 5), however, is acceptable. The dilution water, effluent, and pre-mixing chambers for both systems are illustrated in Figures 6, 7, and 8. Both systems employ the same control panel (Figure 9).

If in the range-finding test, the LC50 of the effluent falls in the concentration range, 6.25-100%, pre-mixing is not required. The pre-mixing chamber is bypassed by running a TYGON® tube directly from the effluent in-flow pipe to chamber E-2 (see Figures 3 and 5), and Chambers E-l and D-1 and the pre-mixing chamber are deactivated.

The dilutor systems described here can also be used to conduct tests of the toxicity of pure compounds by equipping the control panel with an auxiliary power receptacle to operate a metering pump to deliver an aliquot of the stock solution of the pure compound directly to the mixing chamber during each cycle. In this case, chamber E-l is de-activated and chamber D-1 is calibrated to deliver a volume of 2000 mL, which is used to dilute the aliquot to the highest concentration used in the toxicity test.

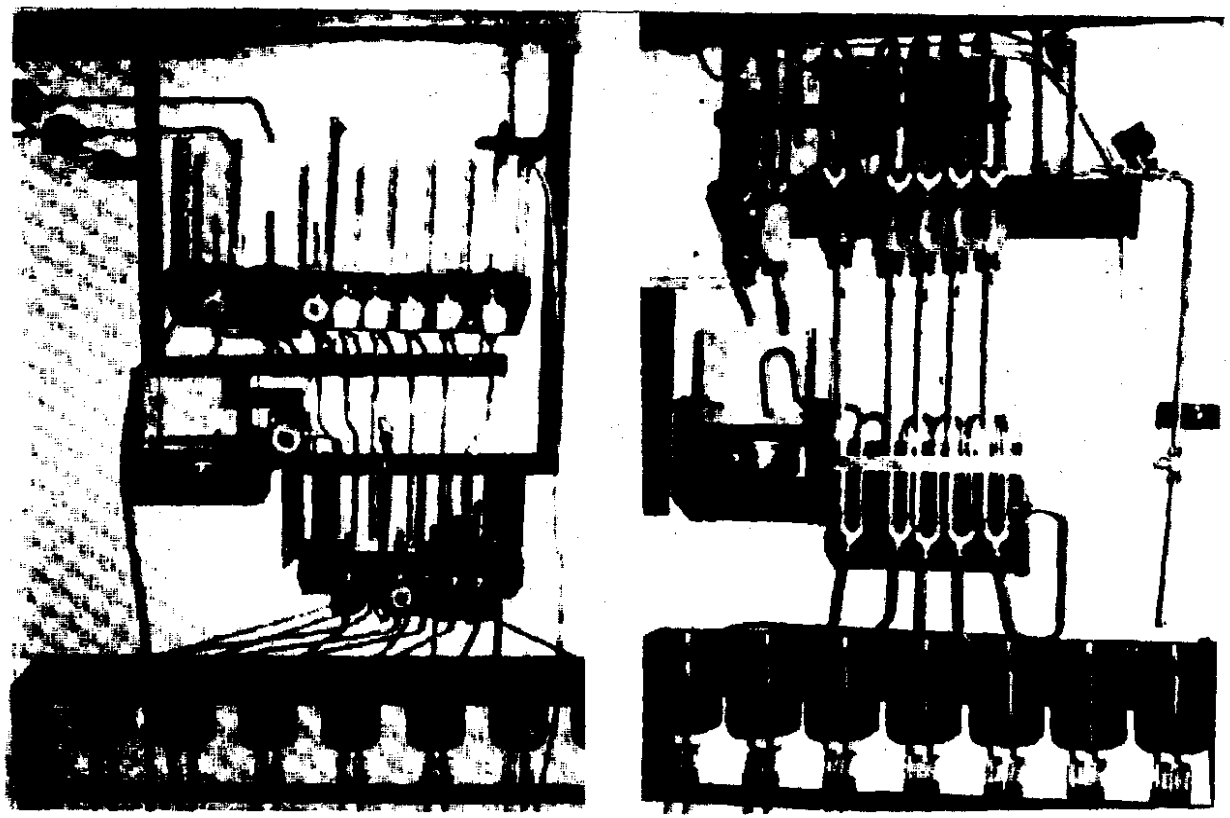


Figure 1. Photographs of the solenoid valve system (left), and the vacuum siphon system (right).

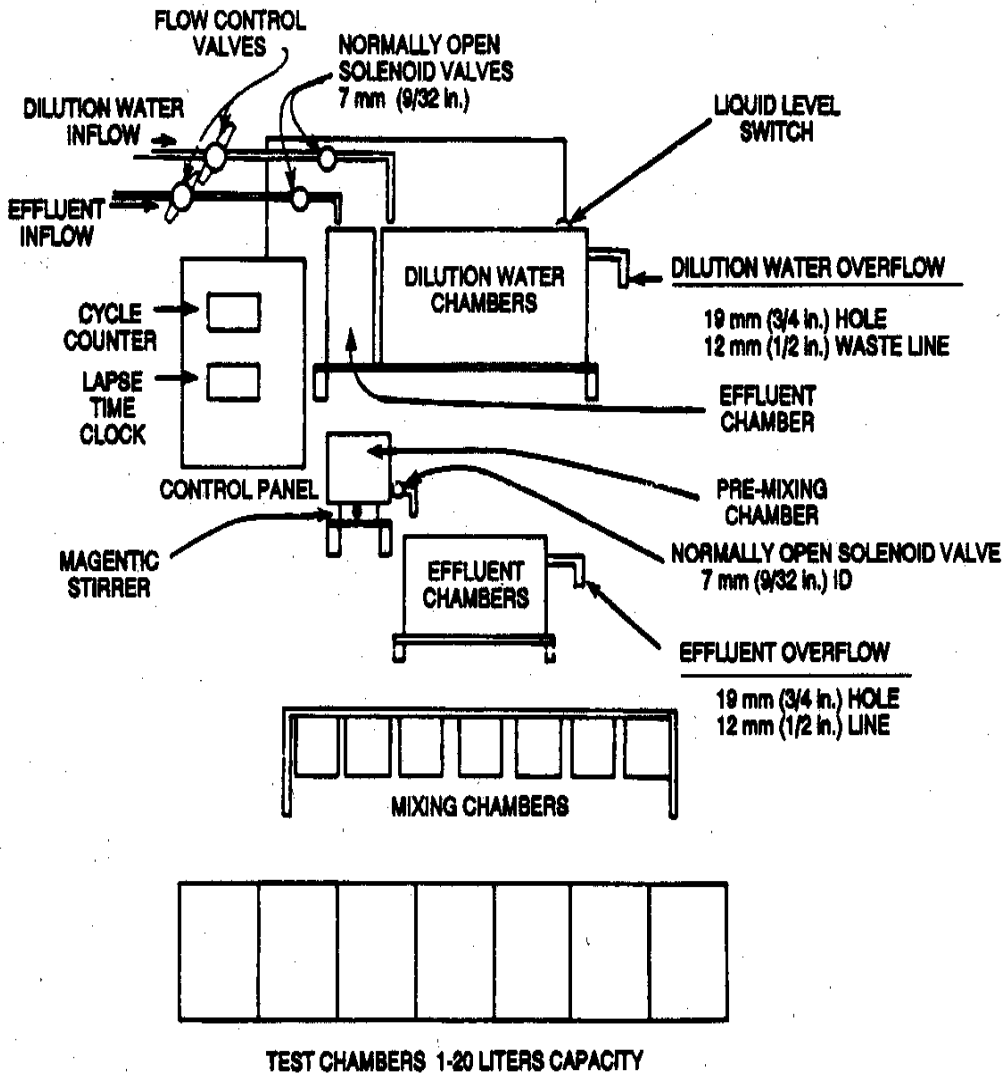
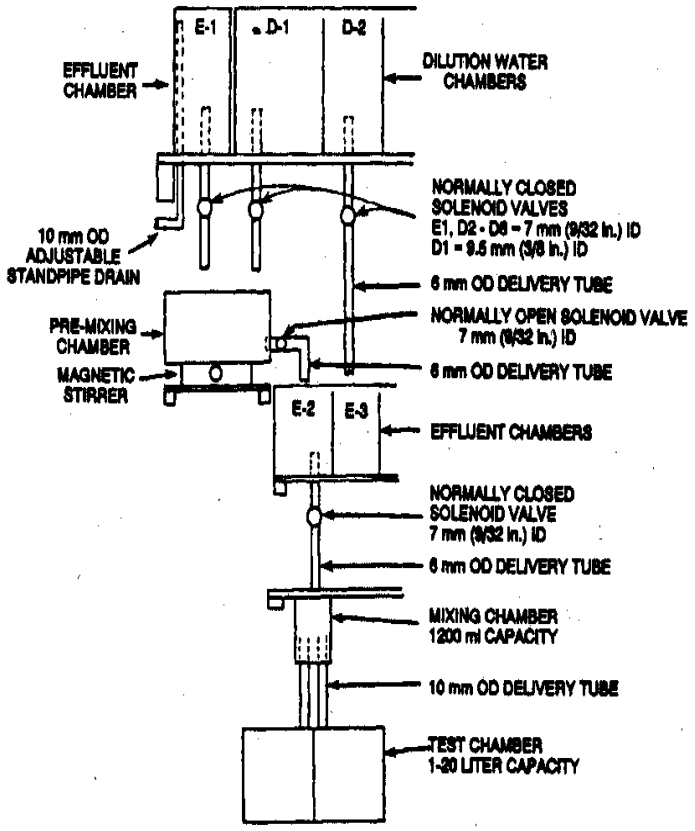



Figure 2. Solenoid valve dilutor system, general diagram (not to scale).




NOTE: WHEN 100% EFFLUENT IS USED AS THE HIGHEST EFFLUENT CONCENTRATION, E-1, D-1, AND THE PRE-MIXING CHAMBER ARE BYPASSED BY CONNECTING A TYGON TUBE TO THE EFFLUENT INFLOW, AND RUNNING IT DIRECTLY TO E-2. IN THIS CASE, SOLENOIDS FOR E-1 AND D-1, AND THE PRE-MIXING CHAMBER ARE DISCONNECTED. D-2 + E-3 = 50% EFFLUENT; D-3 + E-4 = 25% EFFLUENT, ETC.

Figure 3. Solenoid valve dilutor system, detailed diagram (not to scale).

**SOLENOID SYSTEM EQUIPMENT LIST**

1. Dilator Glass.
2. Stainless Steel Solenoid Valves
   a. 3, normally open, two-way, 55 psi, water, 1/4" pipe size, 9/32" orifice size, ASCO 8262152, for incoming effluent and dilution water pipes and mixing chamber pipe.
   b. 1, normally closed, two-way, 15 psi, water, 3/8" pipe size, 3/8" orifice size, ASCO 8030865, for D-l chamber evacuation pipe.
   c. 12, normally closed, two-way, 36 psi, water, 1/4" pipe size, 9/32" orifice size. ASCO 8262C38, for remaining dilution chambers (D2-D6) and effluent chamber (E1-E6) evacuation pipes.
3. Stainless steel tubing, seamless, austenitic, 304 grade for freshwater and 316 grade for saline water.
   a. 10 ft of 3/8" OD, 0.035" wall thickness, for dilution water and effluent pipes.
   b. 60 ft of 1/4" OD, 0.035" wall thickness, for dilution water and effluent pipes.
   c. 1 ft of 3/4" OD, 0.035" wall thickness, for standpipe in D1 chamber.
4. Swagelok tube connectors, stainless steel.
   a. 4, male tube connectors, male pipe size 1/4", tube OD 3/8".
   b. 2, male tube connectors, male pipe size 1/2", tube OD 3/8".
   c. 26, male tube connectors, male pipe size 1/4", tube OD 1/4".
   d. 2, male tube connectors, male pipe size 3/8", tube OD 3/8".
   e. 2, male adaptor, tube to pipe, male size 1/2", tube OD 3/8".
5. 7, 1200 mL stainless steel beakers.
6. Several Ibs each of Neoprene stoppers, sizes 00, 0, and 1; 1 lb of size 5.
7. 14 - aquarium (1-20 liters).
8. Magnetic stirrer.
9. 2 - PVC ball valves, 1/2" pipe size.
10. Dilutor control panel - see Fig. 9 and equipment list.
11. Plywood sheeting, exterior grade: one - 4' x 8' x 3/4", one - 4' x 8' x 1/2".
12. Pineor redwood board, 1" x 8", 20 ft.
I3. Epoxy paint, 1 gal.
14. Assorted wood screws, nails, etc.
15. 25 ft - 14" ID, TEFLON® tubing, to connect the mixing chambers to the test chambers.

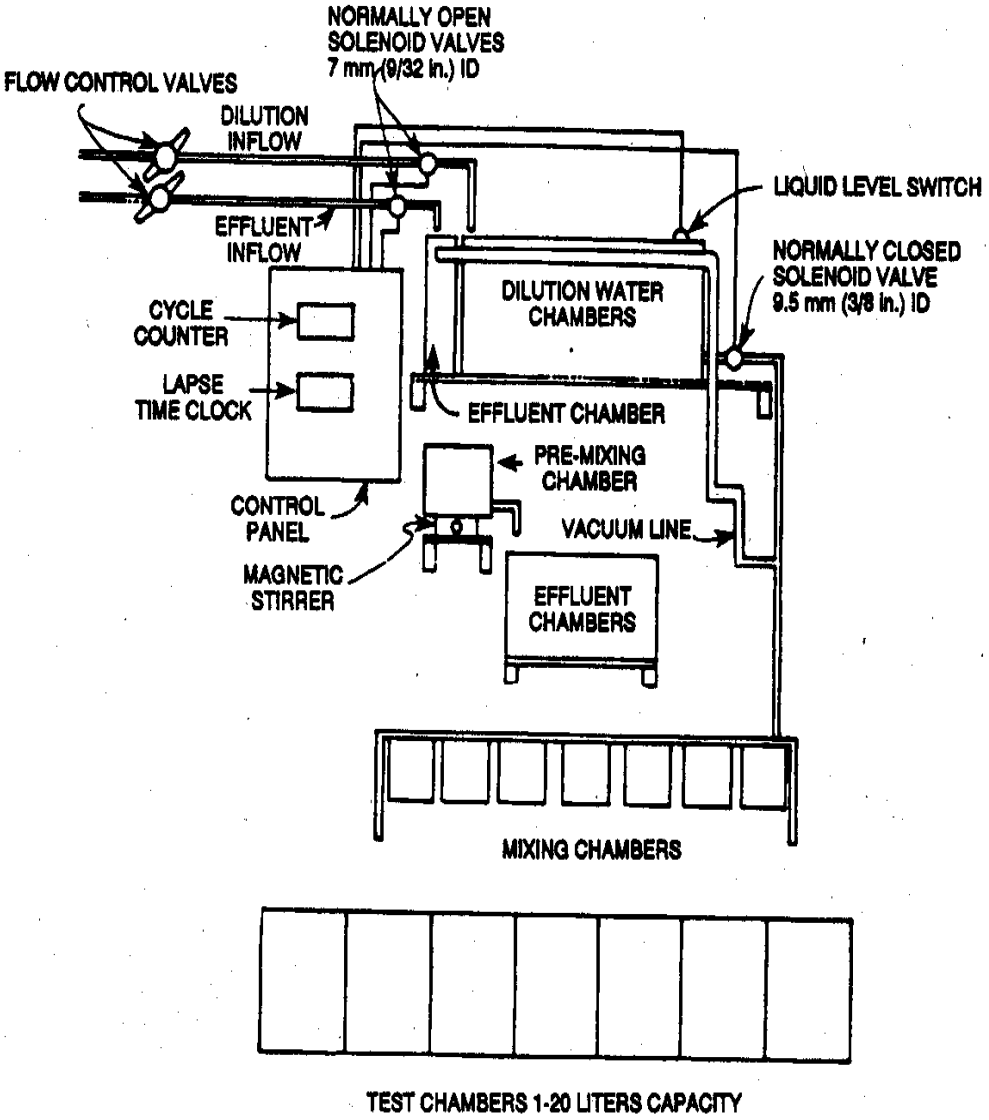



Figure 4. Vacuum siphon dilutor system, general diagram (not to scale).

## VACUUM SIPHON SYSTEM EQUIPMENT LIST

1. Dilutor Glass.
2. Stainless steel solenoid valves.
   a. 2, normally open, two-way, 55 psi, water, 1/4" pipe size, 9/32" orifice size, ASCO 8262152, for incoming effluent and dilution water pipes.
   b. 2, normally closed, two-way, 15 psi, water, 3/8" pipe size, 3/8" orifice size, ASCO 8030865, for dilution water chamber D-6 and effluent chamber E-2.
3. Stainless steel tubing, seamless, austenitic, 304 grade for freshwater and 316 grade for saline water.
   a. 60 ft of 3/8" OD, 0.035" wall thickness, for dilution water and effluent pipes.
   b. 20 ft of 5/16" OD, 0.035" wall thickness, for standpipes in mixing chambers.
   c. 1 ft of 3/4" OD, 0.035" wall thickness, for standpipe in D1 chamber.
4. Swagelok tube connectors, stainless steel.
   a. 4, male tube connectors, male pipe size l/4", tube OD 3/8".
   b. 2, male tube connectors, male pipe size 3/8", tube OD 3/8".
   c. 2, male adaptor, tube to pipe, male pipe size 1/2", tube OD 3/8".
   d. 2, male tube connectors, male pipe size 1/2", tube OD 3/8".
5. 7, 1,200 mL stainless steel beakers.
6. Several Ibs each of Neoprene stoppers, sizes 00, 0, and 1; 1 lb of size 5.
7. 14 - aquarium (1-20 liters).
8. Magnetic stirrer.
9. 2, PVC Ball valves, 1/2" pipe size.
10. Dilutor control panel equipment - see Fig. 9 and equipment list.
11. 7, 120 mL NALGENE® bottles.
12. 3 ft, 1-in-2 aluminum bar, for siphon support brackets.
13. Stainless steel set screws, box of 50, for securing SS tubing in siphon support brackets.
14. Stainless steel hose clamps, box of 10, size #4 or 5, (need 3 boxes).
15. 6, NALGENE® T's, 5/16" OD.
16. 12, TYGON® Y connectors, 3/8" I.D.
17. TYGON® tubing, 3/8" OD, 10 ft.
18. Plywood sheeting, exterior grade: one - 4' x 8' x 3/4", one - 4' x 8' x 1/2".
19. Pine or redwood board, 1" x 8", 20 ft.
20. Epoxy paint, 1 gal.
21. Assorted wood screws, nails, etc.
22. 25 ft of 5/16" ID, TEFLON® tubing, to connect the mix5ng chambers to the test chambers.

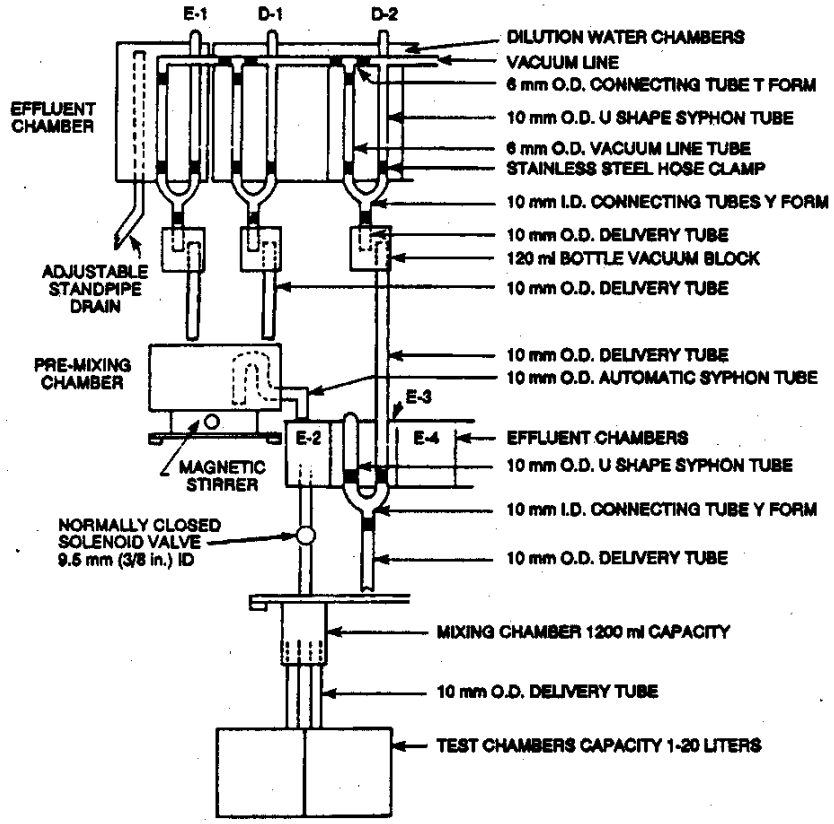



Figure 5. Vacuum siphon dilutor system, detailed diagram (not to scale).

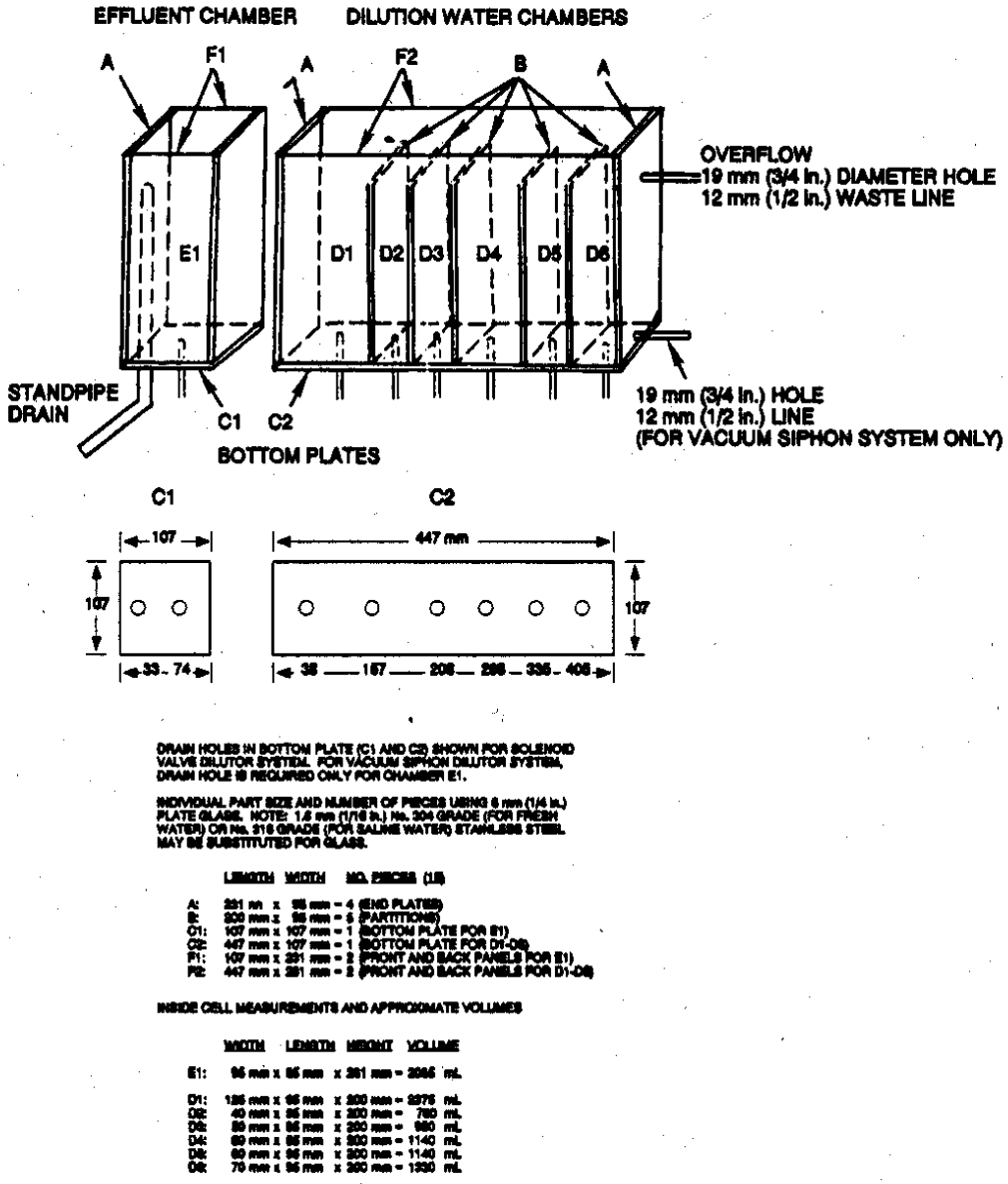
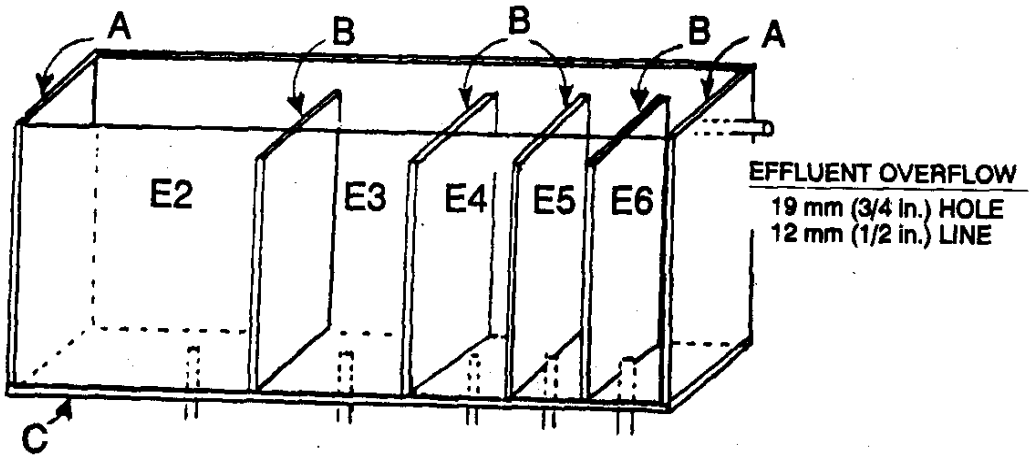
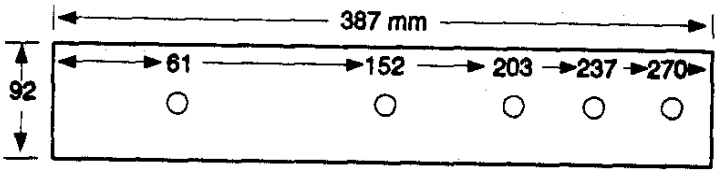



Figure 6. Effluent and dilution water chambers (not to scale).




BOTTOM PLATE (C)




DRAIN HOLES IN BOTTOM PLATE (C) SHOWN FOR SOLENOID VALVE DILUTOR SYSTEM ONLY. FOR VACUUM SIPHON DILUTOR SYSTEM, A DRAIN HOLE IS REQUIRED ONLY FOR CHAMBER E2.

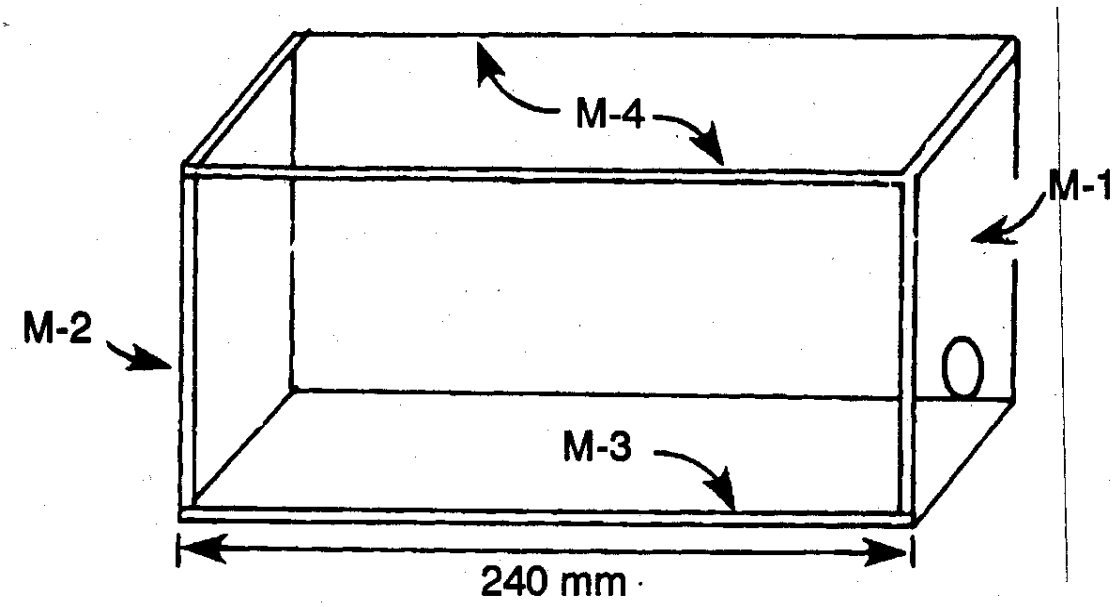
INDIVIDUAL PART SIZE AND NUMBER OF PIECES USING A 6 mm (1/4 in.) PLATE GLASS ARE SHOWN BELOW. NOTE: 1/16 in. No. 304 (FOR FRESH WATER) OR No. 316 STAINLESS STEEL (FOR SALINE WATER) MAY BE SUBSTITUTED FOR GLASS.

| | LENGTH | WIDTH | NO. PIECES (9) |
|---|---|---|---|
| A | 180 mm x | 80 mm | = 2 (END PLATES) |
| B | 155 mm x | 80 mm | = 4 (PARTITIONS) |
| C | 296 mm x | 92 mm | = 1 (BOTTOM PLATE) |
| D | 296 mm x | 180 mm | = 2 (FRONT AND BACK PLATES) |

INSIDE CHAMBER MEASURMENTS AND APPROXIMATE VOLUMES.

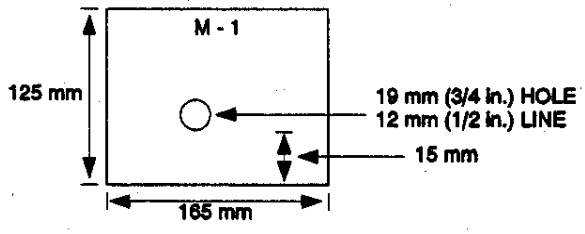
| | WIDTH | LENGTH | HEIGHT | VOLUME |
|---|---|---|---|---|
| E2: | 110 mm x | 80 mm x | 155 mm | = 1364 mL |
| E3: | 60 mm x | 80 mm x | 155 mm | = 744 mL |
| E4: | 30 mm x | 80 mm x | 155 mm | = 372 mL |
| E5: | 30 mm x | 80 mm x | 155 mm | = 372 mL |
| E6: | 30 mm x | 80 mm x | 155 mm | = 372 mL |

Figure 7. Effluent chambers (not to scale).




SIDE VIEW

END VIEW




INDIVIDUAL PART SIZE AND NUMBER OF PIECES USING
6 mm (1/4 in.) PLATE GLASS. APPROXIMATE CAPACITY
4360 mL

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| M-1 | 125 | mm | x | 153 | mm | - | 1 | (END PLATE, WITH HOLE) |
| M-2 | 125 | mm | x | 153 | mm | - | 1 | (END PLATE) |
| M-3 | 240 | mm | x | 165 | mm | - | 1 | (BOTTOM PLATE) |
| M-4 | 240 | mm | x | 125 | mm | - | 2 | (SIDE PLATES) |

Figure 8. Pre-mixing chamber (not to scale).

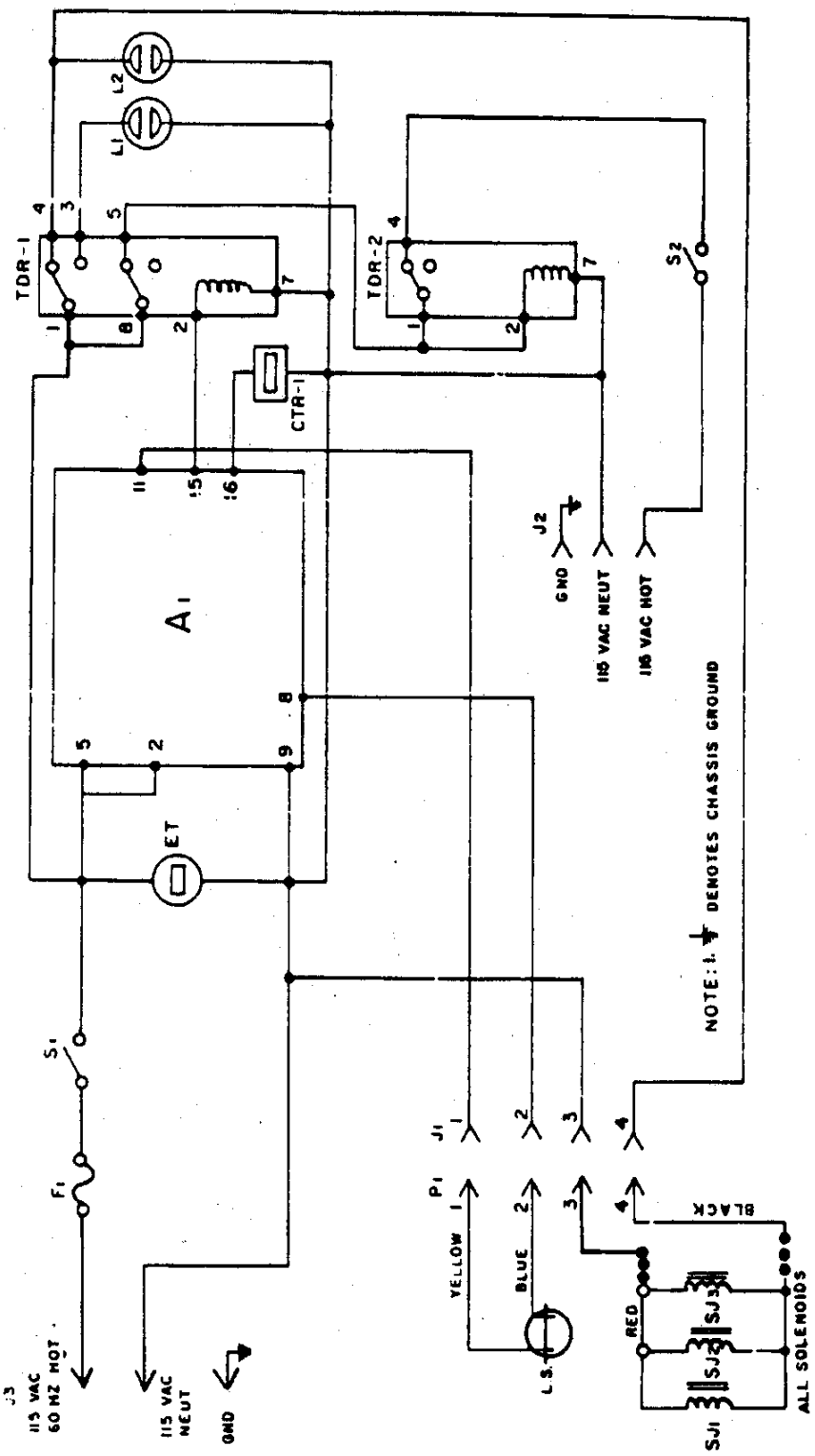



Figure 9. Dilutor control panel wiring diagram.

**DILUTOR CONTROL PANEL EPUIPMENT LIST***

| Designation | CKT Description | Manufacturer |
|---|---|---|
| $A_1$ | Encapsulated amplifier | Cutler Hammer 13535H98C |
| CTR-1 | Cycle counter | Redington #P2-1006 |
| ET | Elapsed time indicator | Conrac #636W-AA H&T |
| $F_1$ | Input power fuse | Little fuse 342038 |
| $J_1$ | Receptacle | Amphenol 91PC4F |
| $J_2$ | Aux A.C. output jack | Stand. 3-prong AC Rcpt. |
| $J_3$ | Main input power cord | Stand. 3-prong AC male plug |
| $L_1$ | Fill indicator light | Dialco 95-0408-09-141 |
| $L_2$ | Emptying indicator light | Dialco 95-0408-09-141 |
| L.S. | Liquid level sensor (Dual Sensing Probe) | Cutler Hammer 13653H2 |
| $P_1$ | Plug | Amphenol 91MC4M |
| $S_1$ | On-off main power switch (spst) | Cutler Hammer 7580 K7 |
| $S_2$ | On-off aux power switch (spst) | Cutler Hammer 7580 K7 |
| $SJ_1$ | Solenoid | (See Solenoid and Vacuum System equipment lists) |
| $SJ_2$ | " | " " " |
| $SJ_3$ | " | " " " |
| $SJ_4$-$SJ_6$ | Additional Solenoids for Solenoid Valve System | " " " |
| TDR-1 | Time delay relay | Dayton 5x829 |
| TDR-2 | Aux time delay relay | Dayton 5x829 |

*Consult local electric supply house.

## APPENDIX D

## PLANS FOR MOBILE TOXICITY TEST LABORATORY

### D.1. TANDEM-AXLE TRAILER

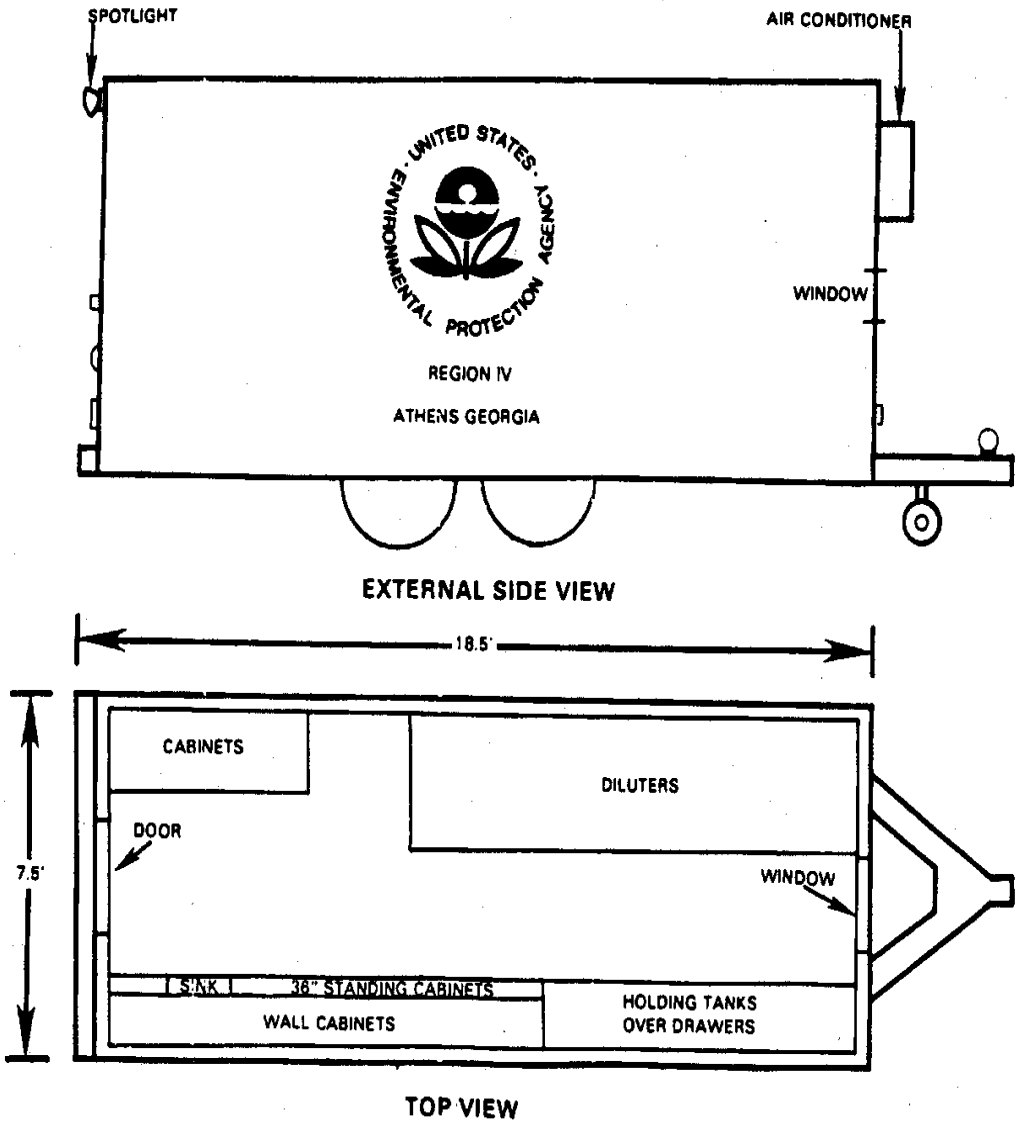



Figure 1. Mobile bioassay laboratory, tandem axle trailer. Above - external side view; below - internal view from above.

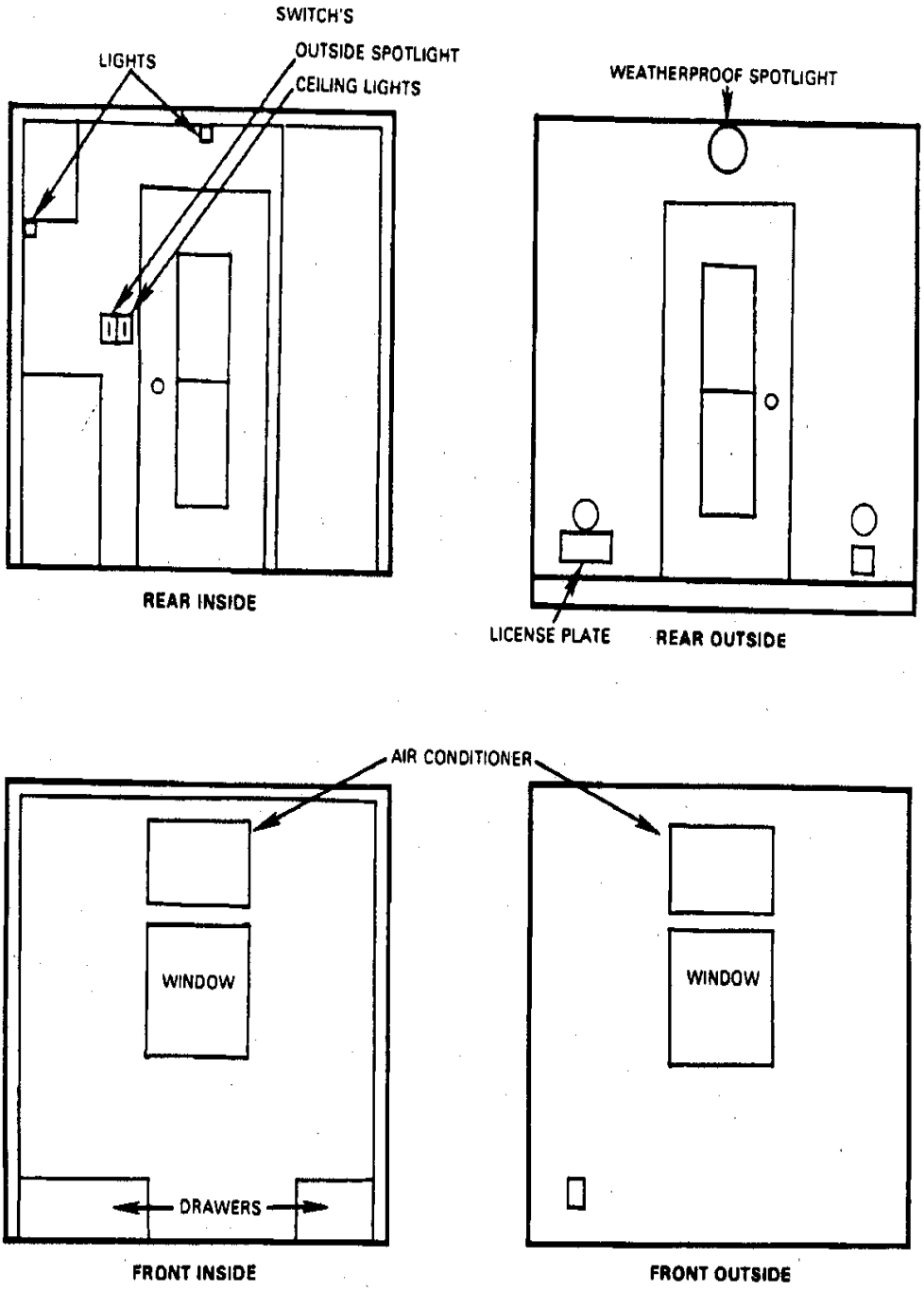



Figure 2. Mobile bioassay laboratory, tandem-axle trailer, external and internal end views.

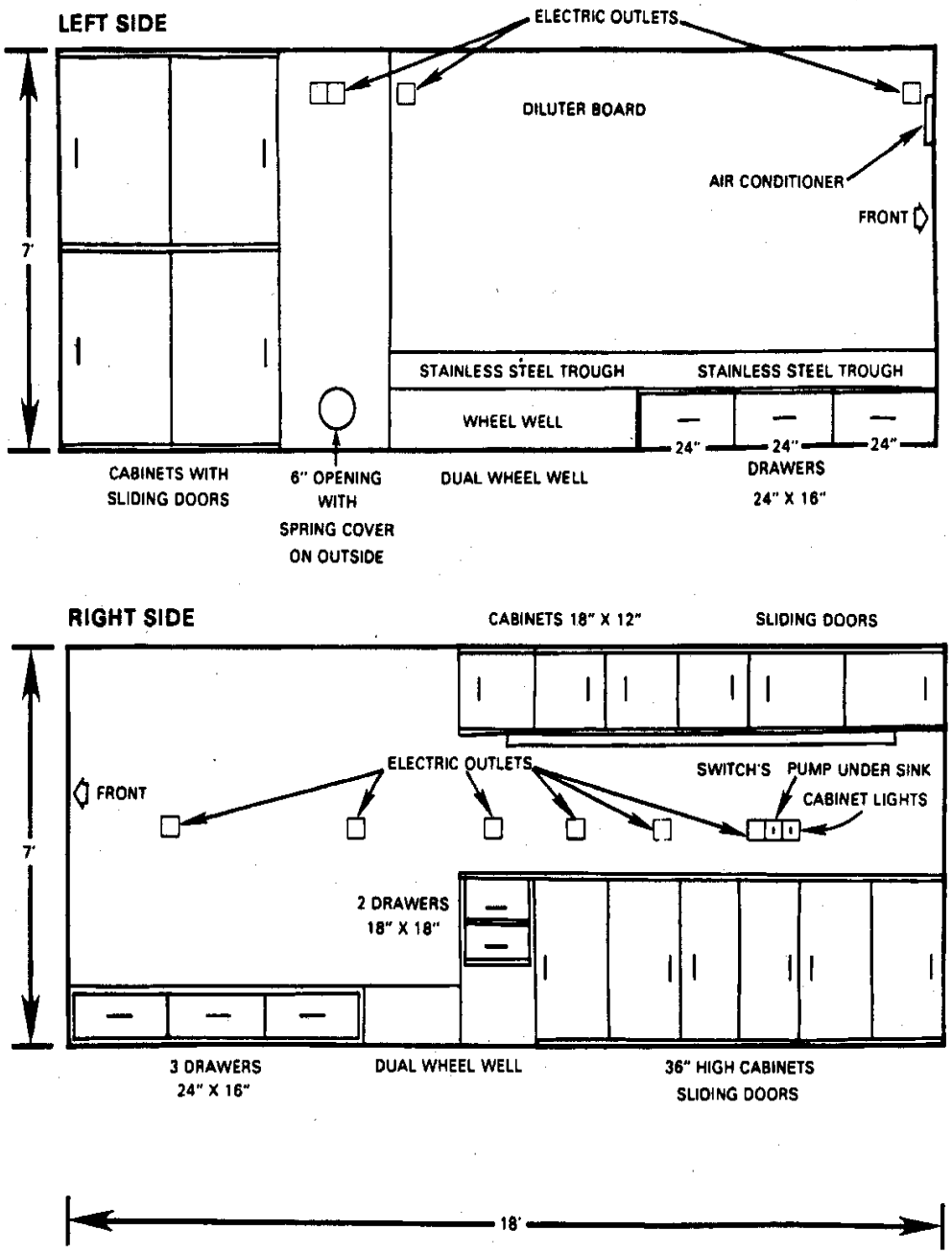



Figure 3. Mobile bioassay laboratory, tandem-axle trailer, internal views of side walls.

## APPENDIX D

## PLANS FOR MOBILE TOXICITY TEST LABORATORY

### D.2. FIFTH WHEEL TRAILER

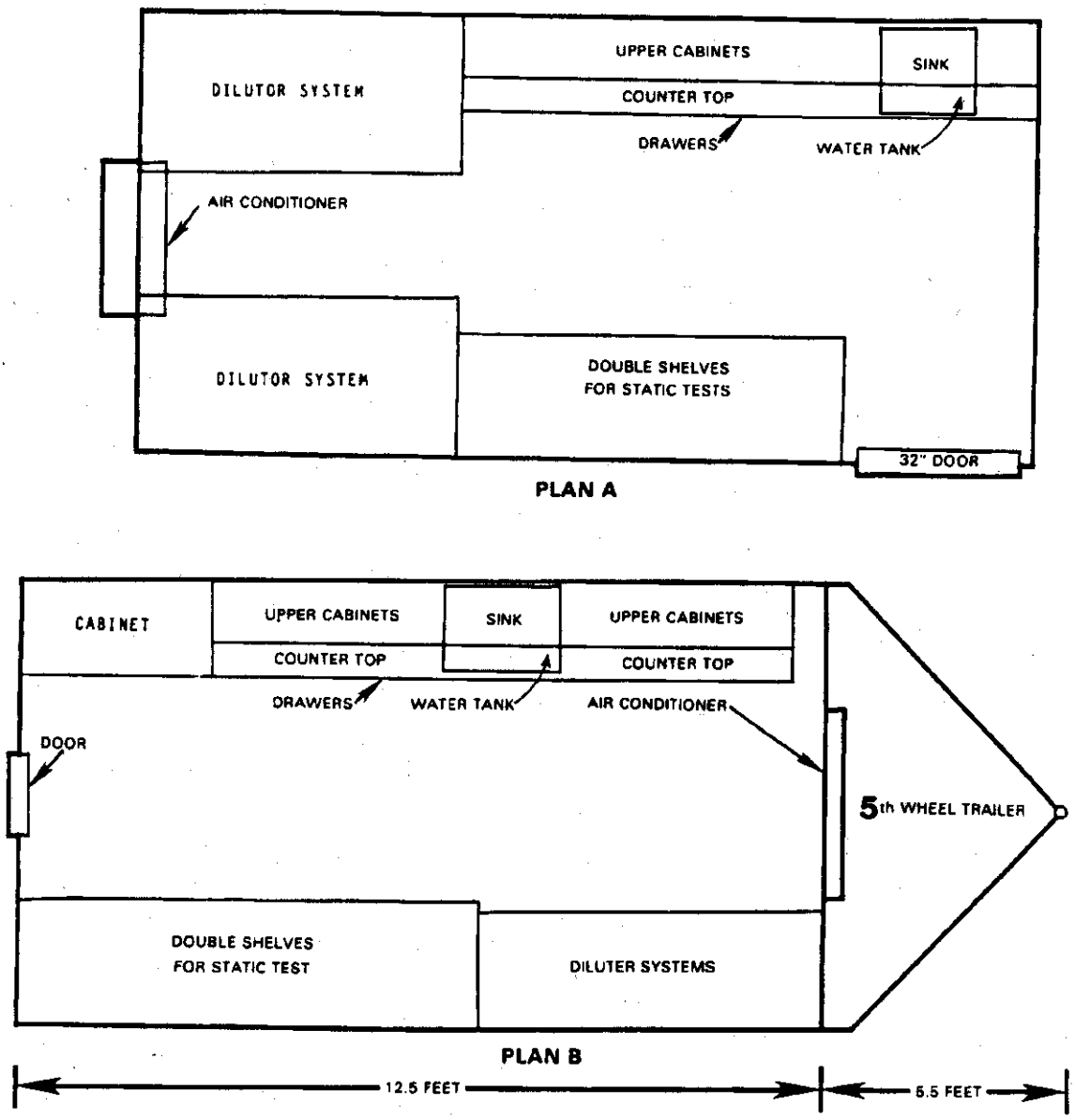



Figure 4. Mobile bioassay trailer, fifth-wheel trailer, internal view from above.

## APPENDIX E

## CHECK LISTS AND INFORMATION SHEETS

### E.1. TOXICITY TEST FIELD EQUIPMENT LIST

Truck

____Boards
____Cinder blocks
____Drums: ____500 gal nalgene
____ 55 gal metal - diesel fuel
____ 22 gal
____Gas can ____ 5 gal
____Jacks
____Jumper cables
____Oil
____Pumps: ____ (2) Homelite
____ ____ Hoses & couplings
____Shovels
____Spare tires (trailer, generator)

Trailer

____Acetone
____Aerators (battery operated)
____Air line: _____Clamps
_____Aerators (battery operated)
_____Air line: ____Clamps
____Stones
____Tubing
____Valves
____Alcohol
____Aluminum foil
____Alkalinity analysis (0.02 N $H_2SO_4$)
____Boots: ____safety
____wading
____Batteries ____D cell
____Beakers: ____150 mL nalgene
____200 mL glass (3 boxes)
____Bottles: ____D.O.
____Wash
____Sample
____VOA vials
____500 mL plastic
____Glass organic
____Qt. w/teflon liner

____Brine shrimp eggs
____Broom
____Brushes (wash)
____Buckets
____Camera
____Chlorine kit (w/chem)
____Cleanser
____Clip board (lg, sm)
____Cork borer set
____Culture dishes (200 mL, Daphnia)
____Daphnia food
____Data sheets: ____Bioassay (static)
____Bioassay (flow-thru)
____Dilutor volume delivery
____Calibrator delivery sheet
____Daily events log
____Dish pan
____Dish rack
____Dissolved oxygen:
____KCL membrane solution
____Membranes
____Meter (YSI)
____Probes
____Reagent: ____$MnSo_4$
____Alkaline azide
____$H_2SO_4$
____0.0375 Na thiosulfate
____Starch
____Distilled $H_2O$
____Emergency road kit
____Enamel pans (lg, sm)
____Erlenmeyer flasks: ____ 500 mL (2)
____1000 mL
____2000 mL
____Extension cords
____Fire extinguisher
____First aid kit
____Fish nets, (lg, sm)
____Flash light
____Generator: ____Oil
____Filter - fuel
____Funnel
____Grease gun (wheels)
____Credit card
____Lock/key
____Siphon hose

## E.1. TOXICITY TEST FIELD EQUIPMENT LIST (CONT.)

____Glass cutter
____Gloves (plastic)
____Graduated cylinders:
25 mL, 50 mL, 100 mL
250 mL, 500 mL, 1000 mL, 2000 mL
____Ground wire & rod
____Hand soap
____Hard hats
____Hardness analysis: ____Buffer
____EDTA
____indicator
____HCl (20%)
____Heaters: ____Aquarium
____Space
____Hose: ____Clamps
____Connectors
____Ice chests

____Jars: ____750 mL (4 boxes)
____3 gal (glass) (1)
____5 gal (glass) (1)
____Sample jugs (2)
____Kimwipes (lg, sm)
____Lab coats (2)
____Level
____Light 110 V
____Log book
____Magnetic stirrers: ____Lighted
____Other

____Mop

____Paper towels
____Parachute cord
____Parafilm
____Pencils, pens
____pH: ____Meters, Orion
____ ____Meters, corning
____Buffers, 4,7,10
____Probes (extras)
____Pipets: ____Bulbs
____Eyedroppers
____Volumetric (1 mL, 5 mL, 10 mL)
____Plastic bags
____Quality assurance - SPCP
____Rain gear
____Reconstituted hard water
____Refractometer
____Respirators (cartridges)

____Rubber bands
____Ruler
____Safety glasses
____Safety manual
____Sample labels
____Scissors
____Screen bioassay cups
____Sea salts
____Separatory funnels & racks
____Silent giants
____Silicon sealant
____Solenoids (spare)
____Stainless steel tubing pieces
____Standard Methods Hand Book
____Stirring bars
____Stoppers (assorted)
____Submersible pumps: ____lg, sm.
____screens
____Super ice
____Tablets (paper)
____Tape: ____Cellophane
____Color coded
____Electrician
____Masking
____Nylon
____Thermometers: ____Dial
____Glass
____Tools (lock/key)
____Tygon tubing, 1/8", 1/4", 3/8"
____Volumetric flasks (1000 mL, 2000 mL)
____WD40
____Weigh boats
____Wire tags

## APPENDIX E

## CHECK LISTS AND INFORMATION SHEETS

### E.2. INFORMATION CHECK LIST FOR ON-SITE INDUSTRIAL OR MUNICIPAL WASTE TOXICITY TEST

1. PRE-TRIP INFORMATION

Facility Name: _____

Address: _____

Phone number: _____

Plant Representative(s): _____

Names, Titles, Addresses of Company Personnel:

A. To Receive Correspondence: _____

_____

_____

B. To Receive Carbons: _____

_____

_____

Date of Notification Letter: _____

State Making Notification and Arrangements: _____

Special Plant Safety/Security Requirements for EPA Personnel to Observe:

_____

Local Accommodation Recommendations: _____

Directions to Plant: _____

_____

_____

Availability of Power Hookups (three 20-amp, 110-V Circuits): _____

Distance from Power Source to Trailer: _____ (Feet)

Trailer Location: _____

Possible Source of Dilution Water: _____

_____

_____

Major Products: _____

Raw Materials: _____

_____

Name of Receiving Water: _____

Schedule of Plant Operation (continuous, weekdays only, etc.): _____

_____

Treatment Steps: _____

_____

_____

_____

Treatment Level (BPT, BAT, etc.): _____

Wastewater Retention Time by Lagoon or Treatment Step:

| Lagoon Designation | Retention Time Hours | Days |
|---|---|---|
| _____ | ____ | ____ |
| _____ | ____ | ____ |
| _____ | ____ | ____ |
| _____ | ____ | ____ |
| _____ | ____ | ____ |

Total Wastewater Retention Time: _____ Hours; _____ Days

Retention Time Determination: _____ Calculated; _____ Actual

Calculation method: _____

Description of Wastewater Tap Point: _____

_____

_____

Description of Outfall (surface, submerged diffuser, etc.): _____

_____

_____

Description of Other Waste Disposal Alternatives in Use (spray irrigation, deepwell, municipal discharge, etc.): _____

_____

_____

2. ON-SITE INFORMATION

Wastewater General Characteristics:

Color: _____

Odor: _____

Solids: _____

Other: _____

Serial Number(s) of Discharge(s) to be Tested: _____

Description of Receiving Water: ____ Uniflow; ____ Tidal;
____ Approximate amplitude, feet

Color: _____

Odor: _____

Solids: _____

Salinity: High tide _____; Low tide _____

Other: _____

_____

7Q10: _____; Ave. flow _____

Description of Receiving Water Zone of Dilution: _____

_____

_____

Location and Description of Water Sampling Point(s): _____

_____

Fresh: _____

Salt: _____

Dilution Waste General Characteristics:

Color: _____

Odor: _____

Solids: _____

Other: _____

_____

Description of Toxicity Test Anomalies (plant production changes, power failure, rain events, etc.):

| Duration | | |
|---|---|---|
| Time & Date | Time & Date | Anomaly |
| | | |
| | | |
| | | |
| | | |
| | | |

Description of Plant maintenance: _____

_____

_____

_____

Attach: DIAGRAM OF WASTEWATER TREATMENT FACILITIES.

3. FOLLOW-UP INFORMATION

Date of follow-up letter: _____

Wastewater Flow (data supplied by discharger):

| Week Prior to Testing | | Week of Testing | |
|---|---|---|---|
| Date | Discharge (MGD) | Date | Discharge (MGD) |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Average Discharge (MGD): _____

Organisms Tested On-site or In-Lab:

| Species | Flow-thru test duration (h) | Static test duration (h) | Test Location | Dates | Results |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Possible Recommended Action as a Result of These Findings:

## APPENDIX E

## CHECK LISTS AND INFORMATION SHEETS

### E.3. DAILY EVENTS LOG

Date: _____ Page ____ of ____ Pages

Site: _____ Day #____ of Study

Initials:_____ Day #____ of Flow-through Test

Time: Notes:

## APPENDIX E

## CHECK LISTS AND INFORMATION SHEETS

### E.4. DILUTOR CALIBRATION FORM

Calibration Site: _____ Calibrator: _____
Dilutor Number: _____ Date: _____

| Effluent Concentration (%) | 100.0 | 50.0 | 25.0 | 12.5 | 6.25 | 3.12 | 1.56 |
|---|---|---|---|---|---|---|---|
| Dilution Water (mL) | 0 | 500 | 750 | 876 | 938 | 969 | 984 |
| Trial 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | | | | | | | |
| Effluent (mL) | 1000 | 500 | 250 | 125 | 62 | 31 | 16 |
| Trial 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| Average | | | | | | | |

Mixing Chamber (%): _____
Wastewater (mL): _____
Dilution Water (mL): _____

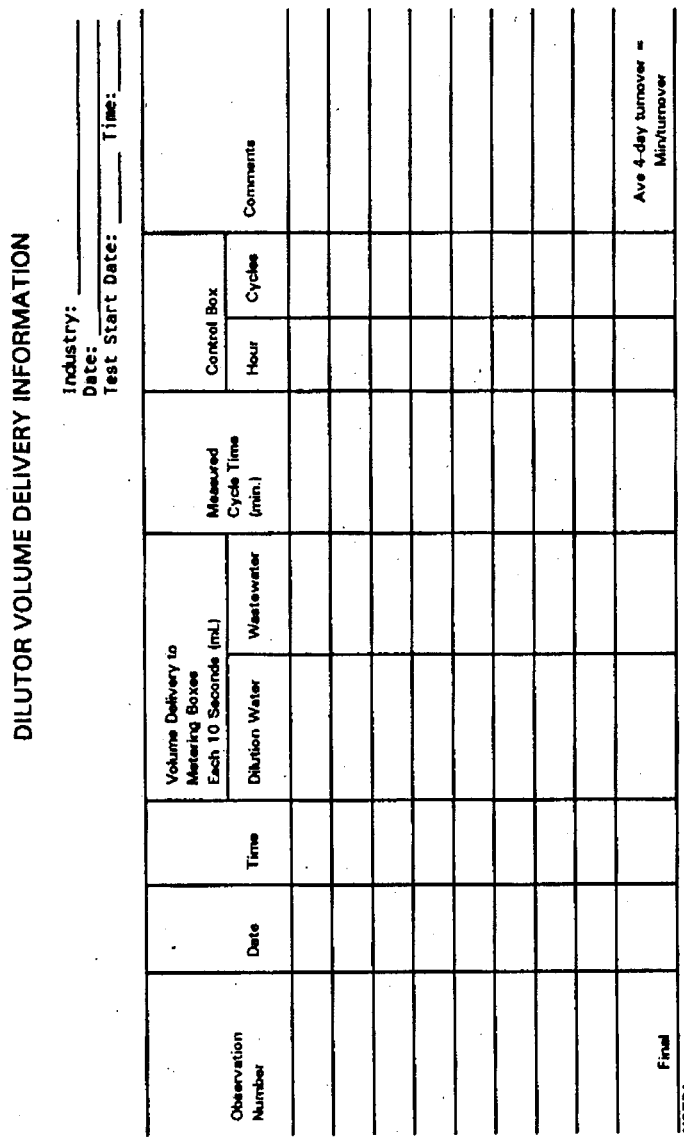
| | Dilution Water | Effluent |
|---|---|---|
| Vol (mL) | | |
| Trial 1 | | |
| 2 | | |
| 3 | | |
| Average | | |

Remarks:

## APPENDIX E

## CHECK LISTS AND INFORMATION SHEETS

## E.5. DAILY DILUTOR CALIBRATION CHECK



DILUTOR VOLUME DELIVERY INFORMATION

Industry: _____
Date: _____
Test Start Date: _____ Time: _____

| Observation Number | Date | Time | Volume Delivery to Metering Boxes Each 10 Seconds (mL) | | Measured Cycle Time (min.) | Control Box | | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | Dilution Water | Wastewater | | Hour | Cycles | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Final | | | | | | | | Ave 4-day turnover = Min/turnover |

USEPA
Athens, GA

STANDARD DILUTOR FLOW RATES

| Cycle Time (min) | Flow rate (mL/10 seconds) Dilution Water | | Wastewater | | Turnover Time (min) |
|---|---|---|---|---|---|
| 2.5 | 532 | | 246 | 43 | |
| 5.0 | 199 | | 92 | 85 | |
| 7.5 | 123 | | 57 | 128 | |
| 10.0 | | 89 | 41 | 170 | |
| 12.5 | | 69 | 32 | 213 | |
| 15.0* | | 67 | 22 | 300 | |

* This turnover rate provides approximately five 80% turnovers per day.

*U.S. GOVERNMENT PRINTING OFFICE:1993-750-002/80302